CLAIMS

What is claimed is:

1. A process for preparing poly(trimethylene terephthalate) side-by-side or eccentric sheath-core bicomponent fibers comprising (a) providing two different poly(trimethylene terephthalate)s differing in intrinsic viscosity (IV) by about 0.03 to about 0.5 dl/g, at least one of which contains about 0.1 to about 10 weight % styrene polymer, by weight of the polymers, and (b) spinning the poly(trimethylene terephthalate)s to form side-by-side or eccentric sheath-core bicomponent fibers where at least one of the component comprises the styrene polymer dispersed throughout the poly(trimethylene terephthalate).

2. The process of claim 1 wherein the styrene polymer is present in at least one of the components in the range of about 0.5 to about 5 weight %, by weight of the polymers in the component.

3. The process of claim 2 wherein the styrene polymer is selected from the group consisting of polystyrene, alkyl or aryl substituted polystyrenes and styrene multicomponent polymers.

4. The process of claim 2 wherein the styrene polymer is polystyrene.

5. The process of claim 1 wherein (a) the poly(trimethylene terephthalate) differ in IV by about 0.10 dl/g to about 0.3 dl/g, (b) the styrene polymer is selected from the group consisting of polystyrene, alkyl or aryl substituted polystyrenes and styrene multicomponent polymers, (c) the styrene polymer is present in at least one of the components in the range of about 0.5 to about 2 weight %, by weight of the polymers in the component, and (d) each component comprises at least about 95 % of poly(trimethylene terephthalate), by weight of the polymer in the component, and each of the poly(trimethylene terephthalate)s contains at least 95 mole % trimethylene terephthalate repeat units.

6. The process of claim 5 wherein the styrene polymer is only in the component with the higher IV poly(trimethylene terephthalate) and the styrene polymer is polystyrene.

7. The process of claim 5 wherein the styrene polymer is only in the component with the lower IV poly(trimethylene terephthalate) and the styrene polymer is polystyrene.

8. The process of claim 1 wherein the side-by-side or eccentric sheath-core bicomponent fibers are in the form of a partially oriented multifilament yarn.

9. A process for preparing poly(trimethylene terephthalate) bicomponent self-crimping yarn comprising poly(trimethylene terephthalate)

bicomponent filaments, comprising (a) preparing partially oriented poly(trimethylene terephthalate) multifilament yarn by the process of claim 8, (b) winding the partially oriented yarn on a package, (c) unwinding the yarn from the package, (d) drawing the bicomponent filament yarn to form a drawn yarn, (e) annealing the drawn yarn, and (f) winding the yarn onto a package.

10. The process of claim 9 wherein the process further comprises drawing, annealing and cutting the fibers into staple fibers.

11. The process of claim 9 wherein (a) the poly(trimethylene terephthalate) differ in IV by about 0.10 dl/g to about 0.3 dl/g, (b) the styrene polymer is selected from the group consisting of polystyrene, alkyl or aryl substituted polystyrenes and styrene multicomponent polymers, (c) the styrene polymer is present in at least one of the components in the range of about 0.5 to about 2 weight %, by weight of the polymers in the component, and (d) each component comprises at least about 95 % of poly(trimethylene terephthalate), by weight of the polymer in the component, and each of the poly(trimethylene terephthalate)s contains at least 95 mole % trimethylene terephthalate repeat units.

12. The process of claim 11 wherein the styrene polymer is polystyrene and the styrene polymer is present in only one of the components.

13. A process for preparing fully drawn yarn comprising crimped poly(trimethylene terephthalate) bicomponent fibers, comprising the steps of:

(a) providing two different poly(trimethylene terephthalate)s differing in intrinsic viscosity (IV) by about 0.03 to about 0.5 dl/g, wherein at least one of the poly(trimethylene terephthalate)s comprises styrene polymer;

(b) melt-spinning the poly(trimethylene terephthalate)s from a spinneret to form at least one bicomponent fiber having either a side-by-side or eccentric sheath-core cross-section;

(c) passing the fiber through a quench zone below the spinneret;

(d) drawing the fiber at temperature of about 50 to about 170°C at a draw ratio of about 1.4 to about 4.5;

(e) heat-treating the drawn fiber at about 110 to about 170°C;

(f) optionally interlacing the filaments; and

(g) winding-up the filaments.

14. The process of claim 13 wherein (a) the poly(trimethylene terephthalate) differ in IV by about 0.10 dl/g to about 0.3 dl/g, (b) the styrene polymer is selected from the group consisting of polystyrene, alkyl or aryl substituted polystyrenes and styrene multicomponent polymers, (c) the styrene polymer is present in at least one of the components in the range of about 0.5 to

about 2 weight %, by weight of the polymers in the component, and (d) each component comprises at least about 95 % of poly(trimethylene terephthalate), by weight of the polymer in the component, and each of the poly(trimethylene terephthalate)s contains at least 95 mole % trimethylene terephthalate repeat units.

15. The process of claim 14 wherein the styrene polymer is only in the component with the higher IV poly(trimethylene terephthalate) and the styrene polymer is polystyrene.

16. The process of claim 14 wherein the styrene polymer is only in the component with the lower IV poly(trimethylene terephthalate) and the styrene polymer is polystyrene.

17. A process for preparing poly(trimethylene terephthalate) self-crimped bicomponent staple fiber comprising:

(a) providing two different poly(trimethylene terephthalate)s differing in intrinsic viscosity by about 0.03 to about 0.5 dl/g, wherein at least one of them comprises styrene polymer;

(b) melt-spinning the compositions through a spinneret to form at least one bicomponent fiber having either a side-by-side or eccentric sheath-core cross-section;

(c) passing the fiber through a quench zone below the spinneret;

(d) optionally winding the fibers or placing them in a can;

(e) drawing the fiber;

(f) heat-treating the drawn fiber; and

(g) cutting the fibers into about 0.5 to about 6 inches staple fiber.

18. The process of claim 17 wherein (a) the poly(trimethylene terephthalate) differ in IV by about 0.10 dl/g to about 0.3 dl/g, (b) the styrene polymer is selected from the group consisting of polystyrene, alkyl or aryl substituted polystyrenes and styrene multicomponent polymers, (c) the styrene polymer is present in at least one of the components in the range of about 0.5 to about 2 weight %, by weight of the polymers in the component, and (d) each component comprises at least about 95 % of poly(trimethylene terephthalate), by weight of the polymer in the component, and each of the poly(trimethylene terephthalate)s contains at least 95 mole % trimethylene terephthalate repeat units.

19. The process of claim 18 wherein the styrene polymer is only in the component with the higher IV poly(trimethylene terephthalate) and the styrene polymer is polystyrene.

20. The process of claim 18 wherein the styrene polymer is only in the component with the lower IV poly(trimethylene terephthalate) and the styrene polymer is polystyrene.